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10/521,252

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EXAMINER

HAILEY, PATRICIA L

ART UNIT

PAPER NUMBER

1793

NOTIFICATION DATE

DELIVERY MODE

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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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| | | | |
|------------------------------|---------------------------------------|--|--|
| Office Action Summary | Application No. 10/521,252 | Applicant(s) MURASAWA ET AL. | |
| | Examiner PATRICIA L. HAILEY | Art Unit 1793 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Applicants' remarks and amendments, filed on November 19, 2007, have been carefully considered. Claim 4 has been canceled, and new claims 5-8 have been added.

Claims 1-3 and 5-8 are now pending in this application.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Applicants' Priority Document was filed on January 14, 2005.

Withdrawn Rejections

The 102(b) rejection of claims 1 and 3 as being anticipated by Behringer (U. S. Patent No. 3,447,957) stated in the previous Office Action has been withdrawn in view of Applicants' amendment to claim 1.

The 103(a) rejection of claims 1-4 as being unpatentable over Kimura et al. (U. S. Patent No. 6,407,033) in view of Behringer (U. S. Patent No. 3,447,957), stated in the previous Office Action, has been withdrawn in view of Applicants' amendment to claim 1.

New Ground of Rejection

The following New Ground of Rejection is being made in view of Applicants' amendments, and in view of the newly discovered references to Kimura et al. (U. S. Patent No. 6,228,480) and to Muradov (U. S. Patent No. 5,246,737).

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

3. Claims 1-3 and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al. (U. S. Patent Nos. 6,407,033 and 6,228,480) in view of Behringer (U. S. Patent No. 3,447,957).

Kimura et al. '033 disclose photocatalyst-carrying structures having an adhesive layer between a photocatalyst layer and a carrier. See the Abstract of Kimura et al.

Examples of the photocatalyst include titanium dioxide (TiO₂) and zinc oxide (ZnO). See col. 8, lines 5-26 of Kimura et al. '033 (considered to read upon **claim 3**), which also discloses that photocatalyst transparency is improved and linear transmittance is high when a photocatalyst of 5-40 nm in particle diameter is employed (col. 8, lines 9-11 of Kimura et al. '033; this disclosure is considered to read upon **claim 2**).

Examples of the adhesive include acrylic-silicon resins, epoxy-silicon resins, and resins containing polysiloxane. See col. 9, lines 11-15 and 41-44, and also col. 10, lines 33-40 of Kimura et al. '033, the latter of which discloses polyester resin and alkyd resin as exemplary sources of polysiloxane.

The carrier can be in the form of "any complex shape such as....fiber and net."
See col. 11, line 66 to col. 12, line 25 of Kimura et al. '033, which also discloses organic polymers as an exemplary substrate.

Kimura et al. '480, also drawn to photocatalyst-carrying structures and coating materials, is relied upon for its teaching that textiles, knit cloth, and nonwoven fabrics, etc., are known substrates (carriers) for photocatalyst-carrying structures. See col. 11, lines 16-21 and col. 12, lines 45-52 of Kimura et al. '480 (considered to read upon **claim 5**).

Neither of the Kimura et al. references discloses shellac as an adhesive layer.

Behringer teaches a composite mixture of photoconductive particles and an insulating, adhesive film-forming resin on a substrate. See col. 2, lines 18-28 of Behringer.

Examples of the photoconductive particles include zinc oxide and titanium dioxide (considered to read upon **claim 3**), which particles are blended with an insulating film-forming adhesive resin and coated onto a supporting substrate (considered to read upon **claim 6**). See col. 2, lines 34-48 of Behringer., as well as col. 3, lines 5-20, which discloses that the particles are blended with the resin in a ratio of "1 part resin and 10 parts photoconductive particles to about 2 parts resin and 1 part photoconductive particles (all parts by weight).", which is considered to overlap the range recited in Applicants' **claim 7**.

Examples of the resin include shellac. See col. 2, lines 49-65 of Behringer.

Examples of the substrate include a heat resistant plastic (considered to read upon the limitation “organic substrate” in **claim 1**). See col. 3, lines 43-50 of Behringer.

In addition to teaching shellac as an exemplary resin, Behringer also discloses alkyd resins and polyesters as exemplary resins (col. 2, lines 57-65) in Patentees’ composite mixture of photoconductive particles and an insulating, adhesive film-forming resin on a substrate.

Because both Kimura et al. references and Behringer teach comparable structures having the same components (photoconductive/photocatalytic particles of titanium dioxide and zinc oxide, an adhesive layer, and a substrate), motivation to combine the teachings of these references is deemed proper.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Kimura et al. ‘033 and ‘480 by substituting the resins disclosed therein as the adhesive layer with shellac resin, as suggested by Behringer, which shows that shellac, alkyd resins, and polyesters are equivalent adhesives known in the art. Therefore, because these were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute shellac for alkyd resins or polyesters, which are disclosed in Kimura et al.

4. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al. (U. S. Patent Nos. 6,407,033 and 6,228,480) in view of Behringer (U. S. Patent No. 3,447,957) as applied to claims 1-3 and 5-7 above, and further in view of Muradov (U. S. Patent No. 5,246,737).

The Kimura et al. and Behringer references are relied upon for their teachings with respect to claims 1-3 and 5-7. Although these references teach the deposition of titanium dioxide onto a substrate, neither reference teaches or suggests the limitations of claim 8.

Muradov is relied upon for its teachings that it is known in the art to immobilize TiO_2 particles (known for their effectiveness in catalytic and photocatalytic reactions, see col. 1, lines 13-32) onto a support, such as fabric. In an embodiment, a TiO_2 slurry is applied to a selected surface of a 30 cm by 30 cm piece of cotton fabric, and immobilized, resulting in a catalyst loading density on the fabric of approximately 0.45 mg/cm^2 , which converts to 4.5 g/m^2 . See col. 5, lines 22-43 of Muradov, as well as Example 4.

See also col. 6, lines 20-27 of U. S. Patent No. 5,604,339, in which a density of no more than 2 g/m^2 corresponds to a thickness of from about 1 to about 4.5 microns, which falls within the photocatalyst layer thickness of “0.1 μm or thicker and 5 μm or thinner” taught by Kimura et al. '033 (col. 11, lines 53-59).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to reasonably expect the photocatalyst layer of Kimura et al. '033 to exhibit a loading density within the range claimed by Applicants. Furthermore, the claimed loading would have been a result of routine experimentation by one of ordinary skill in the art in an effort to optimize the photocatalytic material and its utility, taking into consideration the specific substrate to be coated and the environment in which it will be utilized, and the reactions which are desired to be photocatalyzed.

Response to Arguments

In response to Applicants' arguments that "it is never expected...considering the teachings of Kimura US '033 to achieve the technical idea of the instant invention that feel and flexibility can be maintained", it is the Examiner's position that such a feature, unexpected or otherwise, is not recited in the instant claims.

Behringer is relied upon for its teachings regarding the admixing of a resin such as shellac with photoconductive particles, e.g., TiO₂. Although this reference may disclose a glass plate as a substrate, the reference actually teaches coating glass with, for example, a heat resistant plastic such as polyethylene terephthalate or tetrafluoroethylene. Further, the presence of a substrate is optional. See col. 3, lines 43-56 of Behringer.

For these reasons, Applicants' are not persuasive.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PATRICIA L. HAILEY whose telephone number is (571)272-1369. The examiner can normally be reached on Mondays-Fridays, from 7:00 a.m. to 3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo, can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group 1700 Receptionist, whose telephone number is (571) 272-1700.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICIA L. HAILEY/
Primary Examiner, Art Unit 1793
February 4, 2007

/Jerry A Lorengo/
Supervisory Patent Examiner, Art Unit 1793